

**What is claimed is:**

- 1        1.        A method of predicting problems in an automated dialog with a user  
2        based on the user's input communications, comprising:  
3                determining whether a probability of conducting a successful dialog  
4        with the user exceeds a first threshold, a successful dialog being a dialog  
5        exchange between an automated dialog system and the user that results in at  
6        least one of processing of the user's input communication and routing the user's  
7        input communication, wherein if the first threshold is exceeded, further dialog is  
8        conducted with the user.
- 1        2.        The method of claim 1, wherein if the first threshold is not  
2        exceeded, the user is routed to a human for assistance.
- 1        3.        The method of claim 1, further comprising:  
2                determining whether a probability of conducting a successful dialog  
3        with the user exceeds a second threshold, the second threshold being greater  
4        than the first threshold, wherein if the second threshold is exceeded, further  
5        dialog is conducted with the user using a current dialog strategy.
- 1        4.        The method of claim 3, wherein if the second threshold is not  
2        exceeded, further dialog is conducted with the user using an adapted dialog  
3        strategy.
- 1        5.        The method of claim 4, wherein the adapted dialog strategy  
2        includes one of prompting the user with choices and prompting the user to  
3        confirm the recognition and understanding data.
- 1        6.        The method of claim 1, wherein the user's input communication  
2        includes at least of verbal and nonverbal communications.
- 1        7.        The method of claim 6, wherein the nonverbal communications  
2        include at least one of gestures, body movements, head movements, non-  
3        responses, text, keyboard entries, keypad entries, mouse clicks, DTMF codes,  
4        pointers, stylus, cable set-top box entries, graphical user interface entries, and  
5        touchscreen entries.
- 1        8.        The method of claim 1, wherein the method is used for customer  
2        care purposes.

1           9.     The method of claim 1, wherein the probability is determined using  
2 recognition and understanding data derived from the user's input communication.

1           10.    The method of claim 1, wherein the probability is determined using  
2 dialog training data stored in a dialog training database, the dialog training data  
3 including at least one of dialog classification models and extracted dialog  
4 features.

1           11.    The method of claim 10, wherein the extracted dialog features are  
2 derived from recognition, understanding and dialog data.

1           12.    The method of claim 1, further comprising:  
2                storing a first dialog exchange in a dialog history database, wherein  
3 the first dialog exchange includes a first automated dialog output and a first  
4 user's input communication and the further dialog conducted with the user results  
5 in a second dialog exchange, wherein the second dialog exchange includes a  
6 second dialog output and a second user's input communication; and  
7                determining whether the probability of conducting a successful  
8 dialog with the user exceeds the first threshold using the first dialog exchange  
9 and the second dialog exchange.

1           13.    The method of claim 12, wherein the method is recursive in that the  
2 determining step determines the probability of conducting a successful dialog  
3 with the user exceeds the first threshold using the each of the dialog exchanges  
4 conducted.

1           14.    The method of claim 1, further comprising:  
2                receiving the user's input communication;  
3                recognizing portions of the user's input communication; and  
4                providing an input to the dialog predictor based on applying a  
5 confidence function to the recognized portions of the user's input communication.

1           ~~15.~~    An automated dialog problem prediction system that predicts  
2 problems in an automated dialog with a user based on the user's input  
3 communications, comprising:

4                a dialog manager that output dialog to the user;

5 a dialog predictor that determines whether a probability of  
6 conducting a successful dialog with the user exceeds a first threshold, a  
7 successful dialog being a dialog exchange between an automated dialog system  
8 and the user that results in at least one of processing of the user's input  
9 communication and routing the user's input communication, wherein if the first  
10 threshold is exceeded, the dialog predictor prompts the dialog manager to  
11 conduct further dialog with the user.

1 16. The system of claim 15, wherein if the first threshold is not  
2 exceeded, the dialog predictor prompts the dialog manager to route the user to a  
3 human for assistance.

1 17. The system of claim 15, wherein the dialog predictor determines  
2 whether a probability of conducting a successful dialog with the user exceeds a  
3 second threshold, the second threshold being greater than the first threshold,  
4 and if the second threshold is exceeded, the dialog predictor prompts the dialog  
5 manager to conduct further dialog with the user using a current dialog strategy.

1 18. The system of claim 17, wherein if the second threshold is not  
2 exceeded, the dialog predictor prompts the dialog manager to conduct further  
3 dialog with the user using an adapted dialog strategy.

1 19. The system of claim 18, wherein the adapted dialog strategy  
2 includes one of prompting the user with choices and prompting the user to  
3 confirm the recognition and understanding data.

1 20. The system of claim 15, wherein the user's input communication  
2 includes at least of verbal and nonverbal communications.

1 21. The system of claim 15, wherein the system is used for customer  
2 care purposes.

1 22. The system of claim 15, wherein the dialog predictor determines  
2 the probability using recognition data provided by a recognizer and  
3 understanding data provided by a language understanding unit, and the  
4 recognition and understanding data is derived from the user's input  
5 communication.

1           23.    The system of claim 15, further comprising a dialog training  
2 database for storing dialog training data, wherein the dialog predictor determines  
3 the probability using the dialog training data stored in a dialog training database,  
4 the dialog training data including at least one of dialog classification models and  
5 extracted dialog features.

1           24.    The system of claim 23, wherein the extracted dialog features are  
2 derived from recognition, understanding and dialog data.

1           25.    The system of claim 15, further comprising:  
2                   a dialog history database that stores a first dialog exchange,  
3 wherein the first dialog exchange includes a first automated dialog output and a  
4 first user's input communication, and the further dialog conducted with the user  
5 results in a second dialog exchange, the second dialog exchange including a  
6 second dialog output and a second user's input communication, and the dialog  
7 predictor determining whether the probability of conducting a successful dialog  
8 with the user exceeds the first threshold using the first dialog exchange and the  
9 second dialog exchange.

1           26.    The system of claim 25, wherein the dialog predictor determines  
2 whether the probability of conducting a successful dialog with the user exceeds  
3 the first threshold using the each of the dialog exchanges conducted.

1           27.    The system of claim 15, further comprising:  
2                   a recognizer that recognizes the user's input communication; and  
3                   a language understanding unit that applies a confidence function to  
4 the recognized portions of the user's input communication and provides an input  
5 to the dialog predictor.

1           28.    A method of predicting problems in an automated dialog with a user  
2 based on the user's input communications, comprising:

3                   determining whether a probability of conducting a successful dialog  
4 with the user exceeds a first threshold, a successful dialog being a dialog  
5 exchange between an automated dialog system and the user that results in at  
6 least one of processing of the user's input communication and routing the user's

7 input communication, wherein if the first threshold is exceeded, further dialog is  
8 conducted with the user, otherwise, the user is routed to a human for assistance;  
9 determining whether a probability of conducting a successful dialog  
10 with the user exceeds a second threshold, the second threshold being greater  
11 than the first threshold, wherein if the second threshold is exceeded, further  
12 dialog is conducted with the user using a current dialog strategy, otherwise  
13 further dialog is conducted with the user using an adapted dialog strategy.

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